



Heart Disease and Stroke

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Introduction

More New Yorkers die of the major cardiovascular diseases (CVD), including heart disease and stroke, than all other causes of death combined. In 2001, there were 57,921 deaths due to heart disease and 7,935 people died from stroke. Countless more suffer from the disabling effects of CVD. According to the American Heart Association, the combined health and economic costs of CVD in the State of New York in 2000 were about \$16 billion.¹

Heart disease (often referred to as coronary heart disease) results from restricted blood flow through the arteries that supply the heart muscle. A *stroke* is the sudden impairment of brain function that results from the interruption of circulation to part of the brain following either occlusion or hemorrhage of an artery supplying blood to that area of the brain.²

A healthy lifestyle is important in preventing heart disease and stroke. Behavioral change approaches, along with physical and social environments that encourage healthy behaviors, are most effective at reaching a large number of New Yorkers. The major risk factors for CVD include overweight and obesity, physical inactivity, tobacco use, high blood pressure, elevated blood cholesterol, and diabetes mellitus. For people with known risk factors, early detection of CVD through periodic screening and regular contact with health professionals can improve their prognosis. Fortunately, even people who have been diagnosed with CVD can lessen the chances the disease will progress further by adopting healthy behaviors.

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This report includes information gathered in 1997, 1999 and 2001 through the Behavioral Risk Factor Surveillance System (BRFSS). These data provide estimates for how many New Yorkers are already affected by CVD or at increased risk of developing the disease – and what they are doing to lower their risk. Data are presented for various population subgroups during this time period.

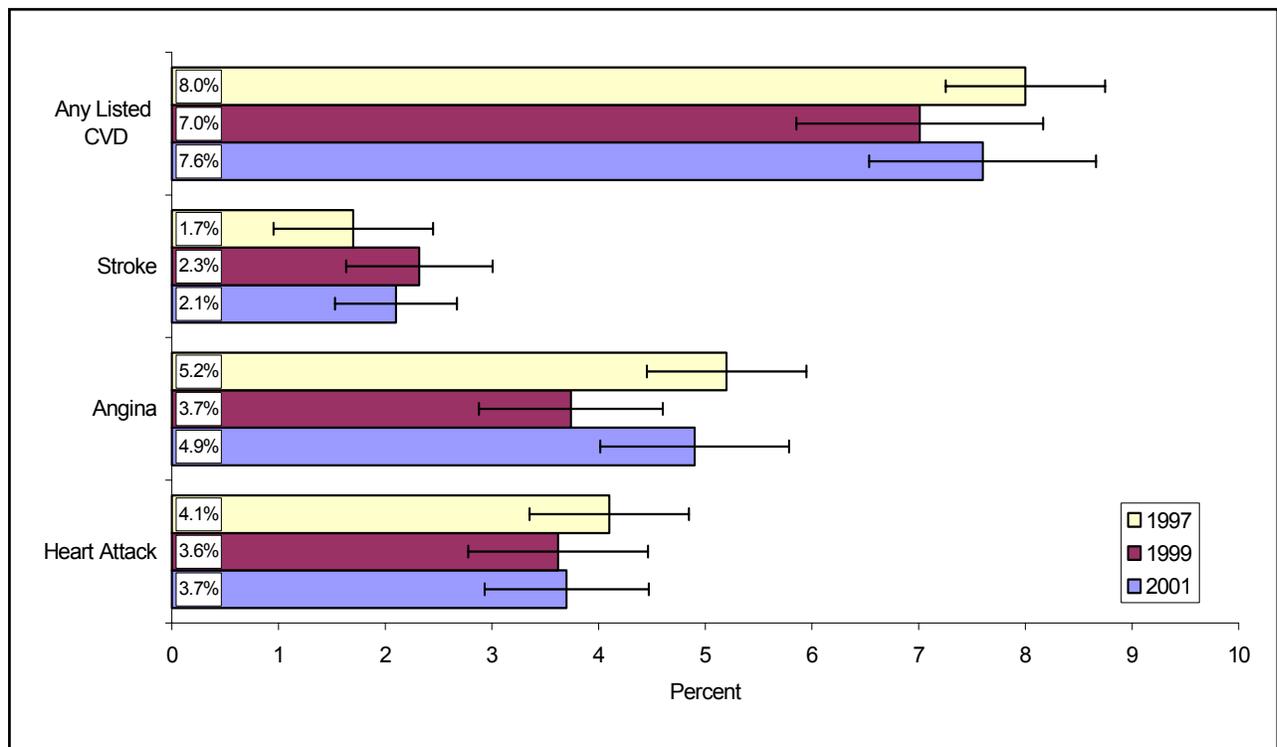
Data Collection

The BRFSS is a statewide random-digit-dialing telephone survey of the non-institutionalized adult population aged 18 years and older. The BRFSS began in New York State in 1983 and has been conducted annually since 1985 following procedures established by the Centers for Disease Control and Prevention (CDC). This survey provides state-specific information on behaviors and risk factors for chronic diseases, infectious diseases, and other health conditions for New York State adults. Information on CVD history has been collected through the BRFSS in 1997 (n=2,477), 1999 (n=2,650) and 2001 (n=3,899). The 1999 and 2001 BRFSS also collected information on CVD-related counseling and preventive practices.

History of Cardiovascular Disease

To estimate how many adults have a history of CVD, respondents were asked if they had ever been told by a doctor, nurse, or other health professional that they have angina, or had a heart attack or a stroke – all common forms of CVD. While the percent reporting a history of each condition separately was 5% or less, nearly 8% had a history of one or more indications of having CVD (Figure 1 and Table 1). Angina was the most commonly reported form of CVD, followed by a heart attack and then stroke. The percent of respondents with a history of one or more clinical forms of CVD did not change significantly between 1997 and 2001.

Figure 1. Percent of respondents with a cardiovascular disease history – 1997, 1999, 2001 BRFSS.



There were 163 individuals interviewed with a history of a heart attack or stroke. These respondents were asked at what age they had their first clinical event (these data are summarized in [Table 2](#) on page 10). For the entire sample, the average age at which a first heart attack occurred was 50 years and the average age for a first stroke was at 56 years. It is more common for a heart attack to occur at a younger age than a stroke.²

Rehabilitation, including efforts to reduce risk factors, is recommended for all patients who have experienced one of these events.^{3, 4, 5} Aggressive risk factor management and other rehabilitation strategies improve patient survival, reduce recurrent events and the need for clinical interventions, and improve the quality of life for these patients.⁶ Of the 163 people reporting a heart attack or stroke, 39% said they received rehabilitation after they left the hospital to help them with their post-event recovery ([Table 3](#)). More information is needed to determine if the low percentage found here is still a cause for concern. The other finding that deserves special mention is that women were much less likely than men to receive outpatient rehabilitation following a heart attack or stroke (26% vs. 51%; chi-square = 6.87, $p < 0.001$).

Personal Actions to Reduce the Risk of Heart Disease and Stroke

There is abundant research showing that dietary intake and level of physical activity have a major influence on a person's risk of developing heart disease and stroke.^{2, 7, 8, 9, 10} Everyone can reduce his or her CVD risk by following a healthy diet and being physically active. Among people who have been diagnosed with CVD, these same actions can affect their chance of having symptoms or a clinical event such as a heart attack or stroke. Clues to understanding how many New York residents are currently practicing these heart healthy behaviors come from responses to a series of questions asked of the entire BRFSS sample in 1999 and 2001.

Healthy Behaviors

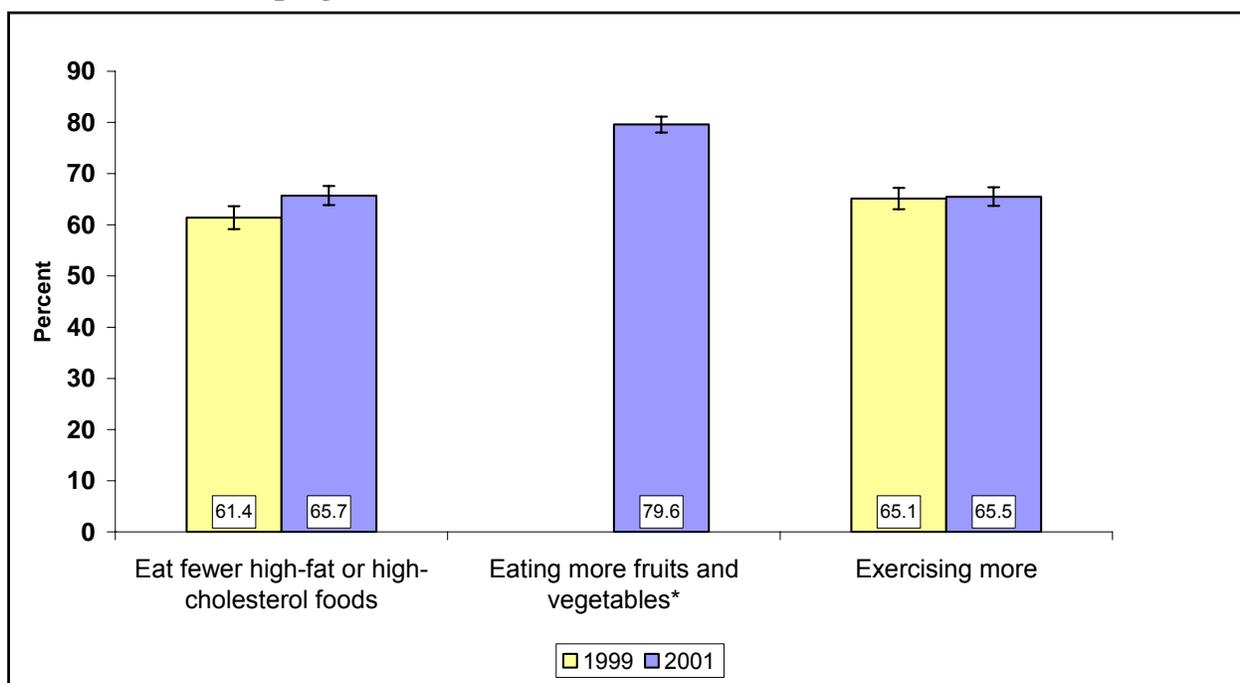
The following questions were asked of all respondents to assess their eating habits and physical activity behaviors:

Are you doing any of the following to lower your risk of heart disease or stroke:

- *Eating fewer high-fat or high-cholesterol foods?*
- *Eating more fruits and vegetables?*
- *Exercising more?*

To lower their risk of heart disease or stroke, the majority of respondents said they were eating more fruits and vegetables, eating fewer high-fat or high-cholesterol foods and/or exercising more. Prevalence estimates for these behaviors are shown in [Figure 2](#) for 1999 and 2001. In 2001, 44% reported they were doing all three.

Figure 2. Percent of respondents engaged in selected healthy behaviors to reduce their risk of developing heart disease or stroke – 1999 and 2001 BRFSS.



* The proportion eating more fruits and vegetables was not assessed in 1999.

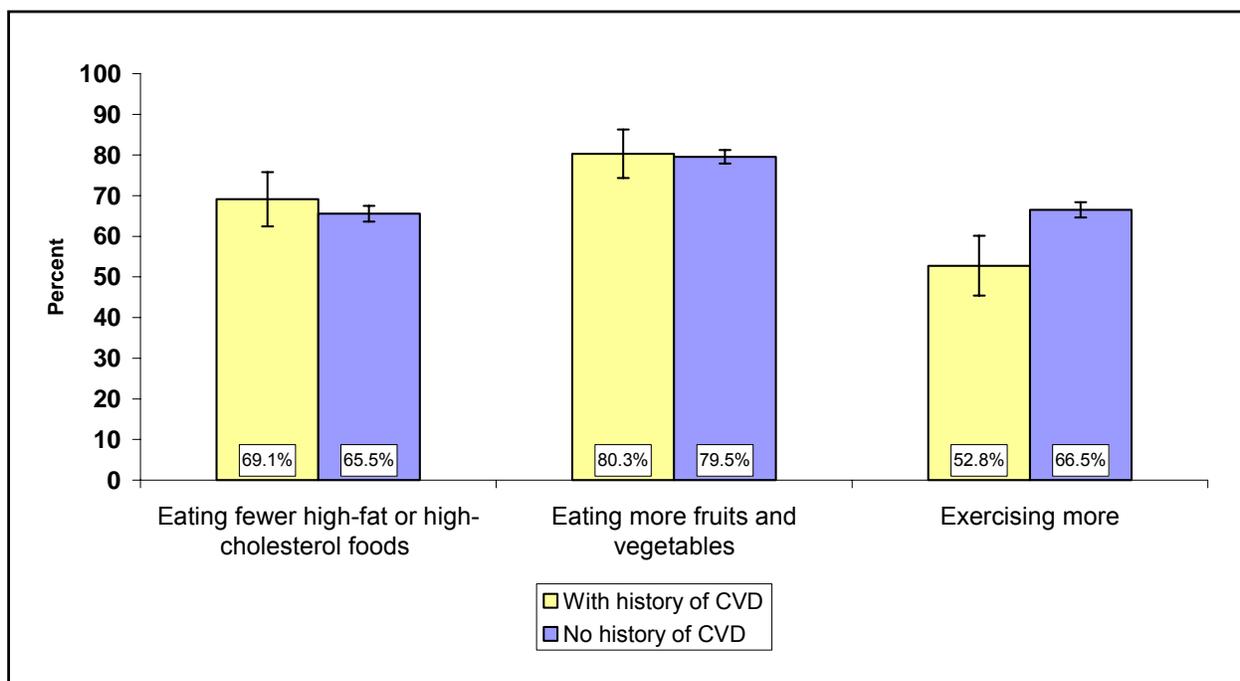
In 2001, a significantly greater proportion of women than men said they engaged in at least one of these healthier dietary behaviors (89% vs. 83%, respectively; chi-square = 18.23, $p < .001$). In contrast, men and women were equally likely to report they were exercising more. There were no differences in the proportion of respondents reporting each of these risk-reduction practices by age group, race/ethnicity, income or educational attainment. Yet, for all three risk-reducing behaviors, people with less income and lower educational attainment were more likely to have been advised by a health professional to engage in the behavior. These data are summarized in [Table 4](#) on page 13.

People who had a self-reported disability were significantly less likely to engage in physical activity than those who were not disabled (47% vs. 69%, respectively; chi-square = 6.63, $p < .01$), even though 43% of them had been advised by a health professional to exercise more (compared to 36% of those without a disability) (see [Table 4](#) on page 13). The difference in physical activity may be partly explained by limits posed by disabilities.

Influence of Having a Personal History of CVD on Health Behaviors

It seems likely that having a history of CVD would be a strong motivator in getting people to engage in behaviors to improve cardiovascular health. This was true only in some instances. Possibly because the presence of disease may have deterred them, people with a CVD history ($n=288$) were significantly less likely than those without a history ($n=3,524$) to report they were exercising more (53% vs. 67%; chi-square: 11.48, $p < 0.01$). By contrast, the proportion of respondents eating more fruits and vegetables, and less high-fat and high-cholesterol foods was not statistically different among people with and without a history of CVD. These data are illustrated in [Figure 3](#).

Figure 3. Relationship of CVD history and cardiovascular health behaviors – 1999 and 2001 BRFSS.



Aspirin Use

For individuals whose 10-year risk of a first coronary event is 10% or greater, according to the U.S. Preventive Services Task Force and the American Heart Association, the benefits of long-term low dose (75-160 mg per day) aspirin therapy are likely to outweigh any risks.^{11, 12, 13} To assess the extent of aspirin use among the BRFSS sample, all respondents were asked, “Do you take an aspirin daily or every other day?” People who said yes were then asked the reason why (e.g., to relieve pain, to reduce the chance of a heart attack, and/or to reduce the chance of a stroke)? If they reported that they did not use aspirin, they were asked, “Do you have a health problem or condition that makes taking aspirin unsafe for you?”

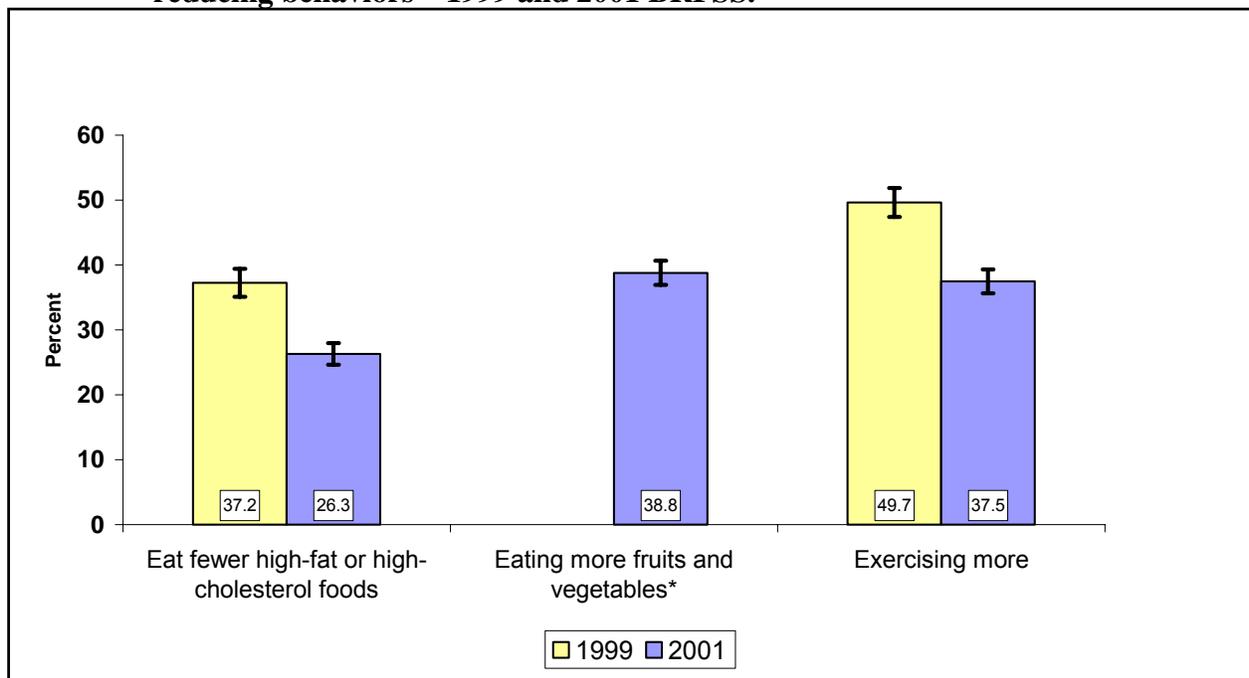
Among all respondents, 26% (n=710) said they were using aspirin daily or every other day. Looking just at those people with a history of CVD, 67% said they took aspirin regularly. The data for aspirin use among all respondents are summarized in [Table 5](#). Here are some other highlights:

- The reasons given for taking aspirin included reducing the chance of a heart attack (83%) or reducing the chance of a stroke (71%).
- Aspirin use was highest among whites, males, those with lower educational attainment, and those with disabilities.
- The proportion using aspirin climbed steadily in older age groups, so that by age 65, nearly half (44%) were taking aspirin regularly.
- Among people who reported they weren’t taking aspirin (n=2,010) only 15% reported they had a health problem or condition that makes taking aspirin unsafe.

Receiving Advice from a Health Professional to Take Preventive Action

People receive cues from many different sources to engage in healthy behaviors, or unhealthy ones. Advice from a health professional to practice cardiovascular health behaviors can be particularly effective in motivating patients to do so.¹⁴ Respondents were asked if they had been advised by a health professional to eat fewer high-fat or high-cholesterol foods; to eat more fruits and vegetables (asked only in 2001); or to exercise more. In 1999, about one-third of respondents reported that they were given advice to eat fewer high-fat or high-cholesterol foods and to exercise more (Figure 4). By 2001, there was a significant reduction in the percent that reported receiving such advice. The percent advised to eat fewer high-fat or high-cholesterol foods dropped to 26% and advice to exercise dropped to 36%. Additionally, 39% of the respondents in 2001 reported that a health professional advised them to eat more fruits and vegetables to lower their CVD risk.

Figure 4. Percent advised by a health professional to engage in cardiovascular disease risk-reducing behaviors – 1999 and 2001 BRFSS.

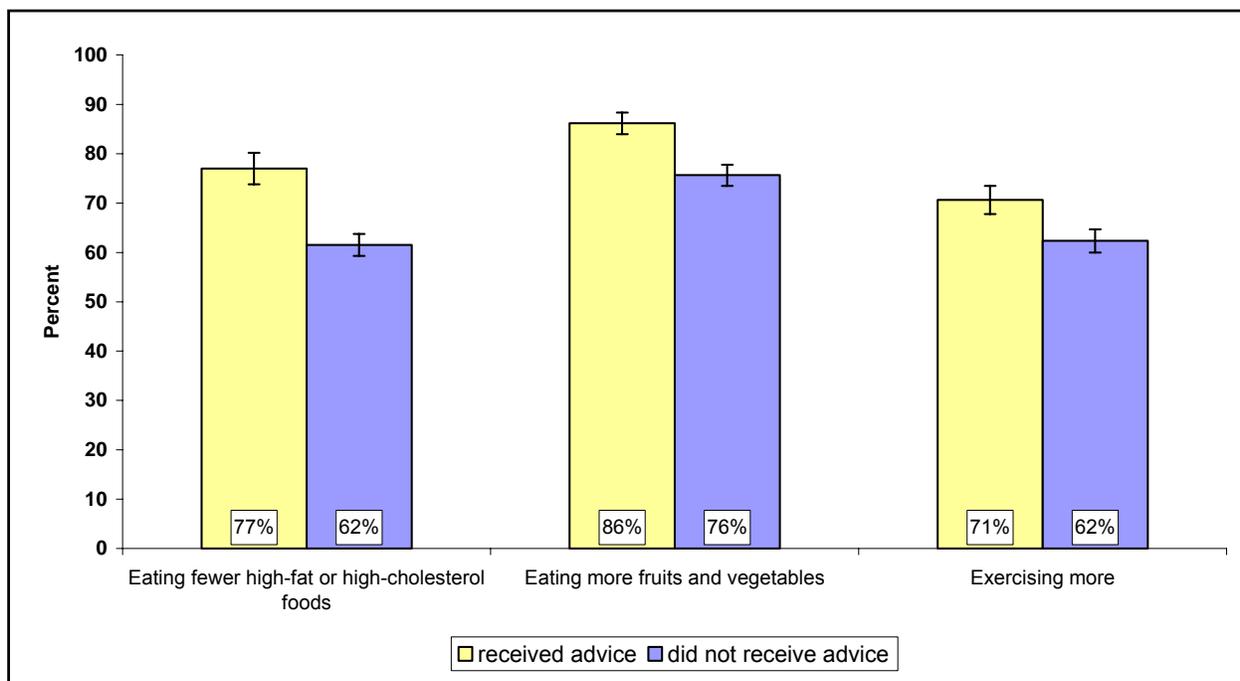


* The proportion eating more fruits and vegetables was not assessed in 1999.

People with a history of heart disease or stroke were far more likely to receive advice from health professionals to practice CVD preventive behaviors than was the general public. Among respondents with a history of heart disease or stroke, professional advice was received by 48% to eat fewer high-fat or high-cholesterol foods, 63% to eat more fruits and vegetables, and 54% to exercise more.

The impact of receiving professional advice to practice these behaviors was quite evident. Figure 5 shows that the proportion of respondents reporting each risk-reducing behavior was higher if they reported that their health professional had advised them accordingly.

Figure 5. Practices to lower CVD risk and receiving advice from a health professional –2001 BRFSS.



Discussion

Since many of the risk factors for CVD, such as obesity and physical inactivity, are becoming more common, it is urgent that we find ways to counter these trends. This can occur by helping people lead active lifestyles, develop healthy eating habits early in life, and avoid tobacco use. For people who have one or more CVD risk factors, preventive efforts can help them avoid or postpone the development of clinical symptoms, such as angina, heart attack or stroke. “Prevention” is the key word.

Sufficient knowledge has accumulated from decades of research in clinical and community-based settings, and application of research findings in communities throughout the world, to reach one important conclusion: now is the time to act. An action plan laying out the essential steps for the nation was published in 2003: *A Public Health Action Plan to Prevent Heart Disease and Stroke*.¹⁰ A plan for the state of New York, developed collaboratively with many partners, was released early in 2004. Called *The New York State Cardiovascular Health Plan*,¹⁵ it gives specific recommendations for achieving cardiovascular health among New Yorkers focusing on the behavior of individuals, as well as changes in policies, environmental supports, and access to and availability of heart-healthy choices in our communities.

New York’s plan targets key sectors in our society: schools, communities, worksites and health care settings. Identifying these sectors directs efforts at reducing CVD risks to settings where people spend a considerable part of their time each day. The sector focus provides opportunities to establish and sustain policies and programs that will lead to healthy lifestyles and improved cardiovascular health. This plan provides a framework and action steps to achieve a vision in which CVD is no longer an inevitable consequence of aging, where people can expect to live in heart-healthy and stroke-free communities.

The recommendations within New York's plan are based on the best available science and the most promising interventions for population-wide impact. To accomplish the objectives set forth in this plan, a commitment is needed from all New Yorkers to do what is possible to reverse the epidemic of CVD.

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Table 1. Cardiovascular disease history: self-reported heart attack, angina, or stroke– 2001 BRFSS

	Heart Attack		Angina		Stroke		Heart Attack, Angina, or Stroke	
	%	± CI 95%	%	± CI 95%	%	± CI 95%	%	± CI 95%
New York State Region	3.7	0.8	4.9	0.9	2.1	0.6	7.6	1.1
NYS exclusive of NYC	3.5	0.8	5.2	1.1	2.4	0.7	8.2	1.3
NYC	4.0	1.6	4.3	1.6	1.6	0.9	6.3	1.8
Age (years)								
18 - 64	2.5	0.8	2.8	0.8	1.0	0.4	4.2	1.0
≥ 65	8.9	2.5	14.3	3.2	7.2	2.4	22.7	3.9
Race/ethnicity								
Non-Hispanic White	3.7	0.8	5.2	1.0	2.4	0.7	8.3	1.2
Other	3.7	1.6	4.3	1.7	1.6	1.0	6.2	2.0
Gender								
Male	4.7	1.3	5.9	1.5	2.3	0.9	8.5	1.7
Female	2.8	0.8	3.9	1.0	2.0	0.7	6.8	1.3
Income								
< \$35,000	5.3	1.5	7.2	1.8	2.9	1.1	10.9	2.1
≥ \$35,000	2.8	0.9	3.5	1.1	1.2	0.6	5.4	1.3
missing	3.1	2.1	4.0	2.2	3.1	1.9	7.2	2.7
Educational Attainment								
H.S., G.E.D or less	4.6	1.4	5.8	1.5	2.6	1.0	9.3	1.9
> HS	3.1	0.9	4.2	1.1	1.7	0.6	6.4	1.3
Disability¹								
Yes	11.8	3.3	15.4	3.5	8.4	2.7	22.3	4.0
No	2.0	0.6	2.6	0.7	0.8	0.3	4.5	0.9

¹ All respondents who report activity limitations due to physical, mental, or emotional reasons OR have health problems that require the use of special equipment.

Table 2. Average age at first heart attack or stroke– 2001 BRFSS

		Heart Attack		Stroke	
		Avg. Age	± CI 95%	Avg. Age	± CI 95%
New York State		50.8	3.6	56.4	4.3
Region					
	NYS exclusive of NYC	52.5	4.6	60.2 *	4.0
	NYC	47.8 *	5.1	43.3 *	8.9
Age (years)					
	18 - 64	NA		NA	
	≥ 65				
Race/ethnicity					
	Non-Hispanic White	53.1	4.3	60.8	3.7
	Other	46.7 *	6.2	41.2 *	8.9
Gender					
	Male	52.9	4.9	55.4 *	5.1
	Female	47.9 *	4.9	57.3 *	6.8
Income					
	< \$35,000	49.4	4.9	55.3 *	6.3
	≥ \$35,000	50.9 *	5.6	59.9 *	6.3
	missing	56.7 *	10.7	54.0 *	9.9
Educational Attainment					
	H.S., G.E.D or less	49.5 *	6.0	54.3 *	6.3
	> HS	52.0	4.1	58.4 *	5.6
Disability¹					
	Yes	50.6	4.4	55.7 *	4.8
	No	51.1 *	5.8	58.0 *	8.8

¹ All respondents who report activity limitations due to physical, mental, or emotional reasons OR have health problems that require the use of special equipment.

* Estimate based on fewer than 50 respondents

Table 3. Heart attack and stroke rehabilitation– 2001 BRFSS

		Outpatient Rehabilitation¹	
		%	± CI 95%
New York State		39.2	9.2
Region			
	NYS exclusive of NYC	53.1	18.6
	NYC	46.9 *	18.6
Age (years)			
	18 - 64	44.8	14.4
	≥ 65	32.8	11.8
Race/ethnicity			
	Non-Hispanic White	32.9	9.1
	Other	56.6 *	19.9
Gender			
	Male	50.5	12.8
	Female	26.2	12.2
Income			
	< \$35,000	36.3	13.4
	≥ \$35,000	40.4	14.0
	missing	46.4 *	27.1
Educational Attainment			
	H.S., G.E.D or less	35.4	13.2
	> HS	42.8	12.7
Disability²			
	Yes	41.8	12.8
	No	35.7	12.9

¹ After you left the hospital following your heart attack/stroke, did you go to any kind of outpatient rehabilitation?

² All respondents who report activity limitations due to physical, mental, or emotional reasons OR have health problems that require the use of special equipment.

* Estimate based on fewer than 50 respondents

Table 4. Percent of respondents practicing selected healthy behaviors to reduce the risk of heart disease and stroke, and advised by a health professional to do so – 2001 BRFSS.

	Eating fewer high fat or high cholesterol foods				Eating more fruits and vegetables				More physically active			
	reported behavior ¹		received advise ²		reported behavior ³		received advise ⁴		reported behavior ⁵		received advise ⁶	
	%	± CI 95%	%	± CI 95%	%	± CI 95%	%	± CI 95%	%	± CI 95%	%	± CI 95%
New York State Region	65.7	1.9	26.3	1.7	79.6	1.6	38.8	1.9	65.5	1.8	37.5	1.9
NYS exclusive of NYC	67.0	2.1	26.1	2.0	79.1	1.8	35.7	2.2	65.1	2.1	36.6	2.2
NYC	63.2	3.5	26.6	3.0	80.6	3.0	44.6	3.4	66.2	3.4	39.0	3.3
Age (years)												
18 - 24	55.4	6.6	8.7	3.3	74.0	5.5	23.4	5.3	71.2	5.7	26.0	6.3
25 - 34	58.8	4.4	17.7	2.9	72.0	4.3	29.4	3.7	65.8	4.3	28.9	3.7
35 - 44	64.6	3.7	24.8	3.4	81.7	2.8	40.6	3.9	66.8	3.6	40.5	3.9
45 - 54	70.6	4.0	35.0	4.2	81.6	3.3	44.1	4.3	65.3	4.1	44.4	4.3
55 - 64	72.0	4.9	36.9	5.2	83.0	4.2	45.2	5.3	66.9	5.1	44.9	5.3
≥ 65	70.6	4.3	31.6	4.4	83.7	3.7	47.0	4.7	59.2	4.6	38.1	4.5
Race/ethnicity												
White	69.2	2.0	25.1	1.8	78.1	1.8	32.5	2.0	63.5	2.1	33.4	2.1
African American	66.6	6.2	27.2	5.9	84.5	4.7	41.3	6.3	67.3	6.1	36.6	6.0
Hispanic	55.0	5.7	30.6	5.0	81.0	5.0	59.2	5.6	71.4	5.4	52.9	5.6
Other	58.3	8.0	25.8	7.3	85.6	5.2	44.7	8.0	69.9	7.8	43.4	8.1
Gender												
Male	62.1	2.9	26.7	2.5	75.6	2.5	36.7	2.8	65.4	2.8	36.0	2.8
Female	68.9	2.3	25.9	2.2	83.2	1.9	40.7	2.5	65.5	2.3	38.8	2.5
Income												
< \$15,000	61.1	6.2	33.8	6.1	79.9	5.1	51.5	6.3	58.6	6.3	48.2	6.4
\$15,000- 24,999	60.5	5.7	26.4	4.5	78.8	5.2	42.7	5.3	64.6	5.4	36.8	5.1
\$25,000- 34,999	64.4	5.2	27.1	4.9	82.0	3.9	42.5	5.4	64.2	5.1	38.7	5.3
\$35,000- 49,999	70.1	4.6	25.9	4.3	80.0	4.0	36.1	4.7	63.2	4.8	32.5	4.5
\$50,000- 74,999	69.6	4.2	25.5	3.9	78.2	3.7	33.9	4.3	68.5	4.2	37.1	4.3
≥ \$75,000	70.4	3.7	26.6	3.7	79.4	3.3	31.7	3.9	71.4	3.7	35.8	4.1
missing	60.6	4.9	22.6	4.2	79.7	4.0	41.4	4.9	62.9	4.8	38.2	4.8
Educational Attainment												
< High School	54.2	6.6	29.2	5.6	81.9	5.7	58.8	6.4	63.4	6.5	53.9	6.5
High School or G.E.D	62.3	3.5	26.9	3.2	78.4	3.0	41.3	3.5	63.8	3.4	37.5	3.4
Some post-High School	66.0	3.5	26.4	3.2	77.8	3.0	34.7	3.5	66.0	3.4	34.5	3.6
College graduate	73.0	2.7	24.7	2.6	81.4	2.4	32.3	2.9	67.4	2.8	33.6	2.9
Disability⁷												
Yes	69.9	4.3	37.0	4.4	76.3	3.9	47.5	4.5	47.4	4.5	43.3	4.4
No	64.8	2.1	24.0	1.8	80.3	1.7	37.0	2.0	69.3	1.9	36.2	2.0

¹ To lower your risk of developing heart disease or stroke, are you eating fewer high fat or high cholesterol foods?

² Within the past 12 months, has a doctor, nurse, or other health professional told you to eat fewer high fat or high cholesterol foods?

³ To lower your risk of developing heart disease or stroke, are you eating more fruits and vegetables?

⁴ Within the past 12 months, has a doctor, nurse, or other health professional told you to eat more fruits and vegetables?

⁵ To lower your risk of developing heart disease or stroke, are you more physically active?

⁶ Within the past 12 months, has a doctor, nurse, or other health professional told you to be more physically active?

⁷ All respondents who report activity limitations due to physical, mental, or emotional reasons OR have health problems that require the use of special equipment.

Table 5. Regular use of aspirin among people aged 35 years or older –2001 BRFSS.

	Take aspirin ¹		Take aspirin to reduce the chance of a health problem ²				Do not take aspirin, but no contraindications ³	
	%	± CI 95%	heart attack ³		stroke ⁴		%	± CI 95%
			%	± CI 95%	%	± CI 95%		
New York State Region	26.3	1.9	83.4	3.2	71.1	3.9	15.0	1.9
NYS exclusive of NYC	28.9	2.3	83.9	3.5	71.2	4.4	16.1	2.3
NYC	21.0	3.4	81.8	7.0	70.6	8.4	12.9	3.4
Age (years)								
35 - 44	12.8	2.8	71.1	10.3	60.0	11.5	7.3	2.2
45 - 54	20.1	3.3	79.1	7.2	63.7	8.8	13.5	3.5
55 - 64	32.1	5.0	86.0	6.2	73.3	8.5	20.5	5.2
≥ 65	44.1	4.5	87.4	4.7	76.2	5.9	26.2	5.5
Race/ethnicity								
White	29.3	2.2	84.4	3.3	71.5	4.2	16.1	2.1
African American	14.4	5.2	82.1 *	15.0	64.4 *	18.9	14.3	6.9
Hispanic	22.3	5.9	82.8	10.8	75.7 *	13.3	14.9	5.5
Other	21.6	9.6	67.9 *	23.9	54.6 *	25.8	6.7	7.2
Gender								
Male	31.3	3.1	85.3	4.0	70.2	5.5	11.5	2.7
Female	22.1	2.4	81.1	4.9	72.1	5.7	17.6	2.6
Income								
< \$15,000	27.1	6.5	81.4	12.7	66.2	14.8	25.5	7.5
\$15,000- 24,999	30.0	5.5	87.4	7.3	72.7	9.6	19.5	6.2
\$25,000- 34,999	21.4	5.2	84.8	9.0	76.2	10.9	20.8	6.5
\$35,000- 49,999	25.5	4.9	82.3	8.1	70.8	10.0	15.3	5.0
\$50,000- 74,999	26.3	4.7	80.1	8.8	70.9	10.0	12.7	4.0
≥ \$75,000	24.4	4.1	84.0	6.7	67.0	9.1	7.4	2.9
missing	29.0	5.3	83.1	7.6	74.3	9.6	12.8	4.2
Educational Attainment								
< High School	31.9	6.7	80.1	10.5	71.3	12.7	15.7	5.5
High School or G.E.D	27.8	3.6	81.6	5.8	66.9	7.2	17.2	3.7
Some post-High School	23.7	3.6	83.3	6.6	74.2	7.7	15.4	4.0
College graduate	24.9	3.1	86.6	4.5	72.8	6.4	12.6	2.9
Disability⁴								
Yes	35.0	4.6	83.4	5.7	75.2	6.9	29.3	5.5
No	24.0	2.1	83.4	3.8	69.4	4.8	11.6	1.9

¹ Do you take aspirin daily or every other day?

² Asked only of respondents who use aspirin.

³ Do you have a health problem or condition that makes taking aspirin unsafe for you?

⁴ All respondents who report activity limitations due to physical, mental, or emotional reasons OR have health problems that require the use of special equipment.